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**REMEDIAL INVESTIGATION/FEASIBILITY STUDY  
QUALITY ASSURANCE PROJECT PLAN ADDENDUM  
LENZ OIL SERVICE, INC.  
LEMONT, ILLINOIS**

**REVISION: 1A**

**SUBMITTED BY:**

**LENZ OIL SETTLING RESPONDENTS**

**JANUARY 22, 1992**

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**PROJECT NO. 0252**

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## **APPENDICES**

- A        Standard Operating Procedures for Non-CLP Analytical Methods
- B        General Standard Operating Procedures for Skinner & Sherman Laboratory
- C        General Standard Operating Procedures for Rocky Mountain Analytical Laboratory
- D        General Standard Operating Procedures for CompuChem Laboratories, Inc.
- E        General Standard Operating Procedures for Warzyn, Inc.
- F        General Standard Operating Procedures for Hauser Laboratory, Inc.

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<u>Number</u>	<u>Description</u>
1-1	TCLP Target Parameters and Project-Required Detection Limits for NAPL Analysis
1-2	TCL Organic and TCL Inorganic Target Parameters and Project-Required Detection Limits for Residential Well Samples
1-3	Summary of Phase II Sampling and Analysis Program
3-1	Project-Required Precision and Accuracy Requirements for Laboratory Analyses
4-1	Sample Volume, Containers, and Preservation Techniques for Water and Soil Samples
10-1	Summary of Laboratory Performance and System Audits



## **1.0 PROJECT DESCRIPTION**

This Quality Assurance Project Plan (QAPP) Addendum has been prepared by ERM-North Central, Inc. (ERM-North Central) to supplement the approved November 12, 1990 QAPP for the Remedial Investigation/Feasibility Study (RI/FS) prepared for the Lenz Oil, Inc. Site, located in Lemont, Illinois. This Addendum is being submitted to modify the approved QAPP for the additional RI/FS Phase II activities as directed by the U.S. Environmental Protection Agency (USEPA). The project description provided in the approved QAPP, dated November 12, 1990, is applicable as presented except that the following additional activities will be performed during Phase II:

- o A neighboring residential well will be sampled and analyzed,
- o The nonaqueous phase liquid (NAPL) will be sampled and analyzed,
- o A shallow soil boring and possibly a shallow monitoring well will be installed,
- o At least one residential well will be abandoned,
- o A second round of ground water samples from the monitoring wells will be collected and analyzed,

- o The surface water in the drainage ditch northwest of the site will be resampled and analyzed for the TAL metals to replace rejected metals data from the Phase I samples,
- o Four of the Phase I soil borings will be resampled and analyzed,
- o Background soil samples will be collected and analyzed, and
- o Additional on-site soil samples will be collected and analyzed.

The Phase II investigative tasks are intended to further characterize the nature and extent of soil, surface water, and ground water contamination at the site. The scope of this QAPP Addendum applies only to the Phase II tasks described in the Phase II Work Plan (Parts A and B). Therefore, only the necessary modifications and/or additions to the existing approved QAPP are presented.

### **1.1 Site Description and History**

The site description and history are presented in the approved Technical Memorandum No. 1, dated May 1, 1991.

### **1.2 Target Compounds**

The discussion of target compounds provided in the approved QAPP, dated November 12, 1990, is applicable as presented with the following exceptions:

The NAPL matrix will be analyzed for Target Compound List (TCL) organics, Target Analyte List (TAL) total inorganics, Toxicity Characteristics Leaching Procedure (TCLP) organics and inorganics, specific gravity, and viscosity. Table 1-1 in the approved QAPP lists the TCL organic and TAL inorganic target parameters and their associated Contract Required Detection Limits for soil/sediment and water samples. Table 1-1 in this document lists the TCLP target parameters for the NAPL and the associated project-required detection limits.

The Round Two ground water samples from the monitoring wells will be analyzed for TCL organics and TAL inorganics. Tentatively Identified Compounds (TICs) will be included in the Contract Laboratory Program (CLP) Routine Analytical Service (RAS) Statement of Work (SOW) for volatile and semivolatile analyses. Ground water samples from the residential well will be analyzed for TCL organics and TAL inorganics using the lower detection limits listed on Table 1-2. The monitoring well samples will be analyzed for both total metals and dissolved metals; however, the residential well samples will be analyzed for total metals, but not dissolved metals.

Samples analyzed for TCL organics will be analyzed in accordance with the CLP SOW OLM01.0 including the revisions in OLM01.1, or the most current SOW for TCL organic analysis. Samples analyzed for TAL inorganics will be analyzed in accordance with CLP SOW ILM01.0 or the most current SOW for TAL inorganics analysis.

The TCLP sample will be extracted in accordance with the Rocky Mountain Analytical Laboratory (RMAL) Standard Operating Procedure (SOP), which is based on USEPA's SW-846 Method 1311 and is included in Appendix A. The TCLP sample extract will be analyzed for the TCLP organics and inorganics in accordance with the CLP SOWs OLM01.0 and ILM01.0, or the most current SOW versions available at the time of sampling.

### **1.3 Project Objectives**

The project objectives provided in the approved QAPP dated November 12, 1990 are applicable as presented except for the information added to the following subsections.

#### **1.3.1 Specific Objectives**

The general objectives provided in the approved QAPP, dated November 12, 1990, are applicable as presented; however, the following objectives are specific to the Phase II investigation.

- o Reevaluating the stratigraphy in the vicinity of well cluster G104 to further define ground water flow.
- o Collecting sufficient data to characterize the physical and chemical nature of the NAPL.

- o Collecting organic ground water data of sufficient quantity and quality to characterize the nature and extent of any site-derived organic ground water contamination.
- o Collecting inorganic ground water data of sufficient quantity and quality to characterize seasonal variations in the extent of any site-derived inorganic ground water contamination.
- o Collecting ground water analytical data of sufficient quality to evaluate the potential risk to human health posed by drinking ground water from a neighboring residential well.
- o Minimizing the spread of ground water contamination by closing and abandoning contaminated private wells.
- o Collecting organic and inorganic soil data of sufficient quantity and quality to characterize the nature and extent of site-derived soil contamination.
- o Collecting inorganic surface water data of sufficient quantity and quality to characterize the nature of any site-derived inorganic contamination in the drainage ditch.

### **1.3.2 Intended Data Uses**

The discussion of intended data uses provided in the approved QAPP, dated November 12, 1990, is applicable as presented with the following additions:

- o Specific gravity and viscosity - used to determine the physical character of the NAPL to establish remedial requirements.
- o TCLP of the NAPL - used to determine the chemical nature of the NAPL to identify remediation alternatives.
- o Laboratory analysis of residential well samples - used to verify the extent of ground water contamination northeast of the site and to evaluate the potential risk to human health caused by drinking ground water from a neighboring residential well.

### **1.3.3 Data Quality Objectives**

The Data Quality Objectives provided in the approved QAPP, dated November 12, 1990, are applicable as presented with the following additions:

- o TCLP extraction of NAPL - Level III.
- o Laboratory analysis of TCLP extract - Level IV.
- o Specific gravity and viscosity of NAPL - Level III.

- o Laboratory analysis of TCL organics and TAL inorganics in ground water samples from a residential well - Level V.

#### **1.4 Sample Network and Rationale**

The Phase II sample network and rationale are provided in the Phase II Work Plan (Parts A and B). Specific sampling locations for each of the sample matrices are shown on figures in the Phase II Work Plan. A summary of the Phase II Sampling and Analysis Program is provided in Table 1-3.

#### **1.5 Project Schedule**

The project schedule provided in the approved QAPP, dated November 12, 1990, is not applicable and should be replaced with the project schedule provided in the Phase II Work Plan-Part A. Work progress reports will be prepared and submitted to the USEPA during the course of the project according to the schedule specified in the Administrative Consent Order.

## **2.0 PROJECT ORGANIZATION AND RESPONSIBILITY**

The discussion of the project organization and responsibility provided in the approved QAPP, dated November 12, 1990, is applicable as presented with the following additions to the appropriate subsections.

### **2.1 Management**

Section 2.1 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following personnel changes and additions:

- o Dave Dollins, the IEPA Project Manager, has been replaced by Tracy Fitzgerald of IEPA.
- o Lisa Snow, the Laboratory Quality Assurance (QA) Director for Skinner & Sherman, Inc., will coordinate and oversee the laboratory TAL inorganic analyses of the monitoring well, surface water, and soil samples.
- o Gary Torf, the Laboratory QA Director for Rocky Mountain Analytical Laboratory (RMAL), will coordinate and oversee the laboratory TCL semivolatiles and pesticide/PCBs analyses of the monitoring well samples and the laboratory TCLP, TCL organic, TAL inorganic, and specific gravity analyses of the NAPL.



- o Mick O'Sadnick, the QA Director for Hauser Laboratories, Inc. (Hauser), will coordinate and oversee the laboratory viscosity analyses of the NAPL.
- o Robert Whitehead, the Laboratory QA Director for CompuChem Laboratories, Inc. (CompuChem), will coordinate and oversee the laboratory TCL organic analyses of the residential well samples.
- o Richard Mealy, the Laboratory QA Director for Warzyn, Inc., will coordinate and oversee the laboratory TAL inorganic analyses of the residential well samples.

## **2.2 Field Activity**

Section 2.2 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following additions to the lists of the ERM-North Central and IEPA subcontractors:

### **ERM-North Central Subcontractors**

#### **Subcontractor**

Skinner & Sherman, Inc.

#### **Service**

CLP RAS analyses of TAL metals and cyanide in the monitoring well samples.

Rocky Mountain Analytical  
Laboratory

CLP RAS analyses of TAL semivolatiles and pesticide/PCBs in the monitoring well samples; CLP RAS analyses of TCL volatiles, semivolatiles, and pesticide/PCBs, TAL metals and cyanide, and specific gravity in the NAPL sample; and TCLP extraction and analysis of the TCLP organics and inorganics in the NAPL sample.

Hauser Laboratories

Viscosity analyses of the NAPL.

ARDL, Inc.

CLP RAS analyses of the TCL volatiles in the monitoring well samples.

CompuChem Laboratories, Inc.

CLP analyses of low-concentration TCL volatiles, semivolatiles, and pesticide/PCBs in the residential well samples.

Warzyn, Inc.

Analyses of TAL metals and cyanide in the residential well samples.

### **IEPA Subcontractors**

#### **Subcontractor**

#### **Service**

Skinner & Sherman, Inc.

CLP RAS analyses of TAL metals in on-site soil, background soil, and surface water samples; and CLP RAS analyses of TAL cyanide in on-site background soil samples.

ARDL, Inc.

CLP RAS analyses of TCL volatiles, semivolatiles, and pesticide/PCBs on-site and background soil samples.

### **2.3 Laboratory Analysis**

Section 2.3 of the approved QAPP, dated November 12, 1990, is not applicable to the Phase II work and should be replaced with the following:

RMAL, located in Arvada, Colorado, will perform the TCL semivolatile and pesticide/PCB analyses of the monitoring well samples and the TCL volatile, semivolatile, and pesticide/PCBs analyses of the NAPL sample in accordance with the CLP SOW OLM01.0, or the most current version. The TAL metals and cyanide analyses of the NAPL will be performed by RMAL in accordance with the CLP SOW ILM01.0, or the most current version. RMAL will also perform the TCLP extraction of the NAPL sample (in accordance with the SOP provided

in Appendix A) and analyze the extract for TCLP organics and inorganics using the CLP SOWs OLM01.0 and ILM01.0 or the most current version. The specific gravity analysis of the NAPL sample will be performed by RMAL in accordance with the SOP provided in Appendix A.

ARDL, of Mount Vernon, Illinois, will analyze the monitoring well samples for TCL volatiles using the CLP SOW OLM01.0 or the most recent version. ARDL will also analyze the on-site and background soil samples for TCL volatiles, semivolatiles, and pesticide/PCBs using the CLP SOW OLM01.0 or the most recent version.

Skinner & Sherman, of Waltham, Massachusetts, will perform the TAL metals and cyanide analyses of the monitoring well, on-site soil, and background soil samples in accordance with CLP SOW ILM01.0 or the most recent version. They will also analyze the surface water samples for those TAL metals that were rejected during the Phase I investigation using the CLP SOW ILM01.0 or the most recent version.

Hauser Laboratories, of Boulder, Colorado, will analyze the NAPL sample for viscosity using the SOP provided in Appendix A.

CompuChem Laboratories, Inc. of Waltham, Massachusetts, will analyze the residential well samples for the TCL volatiles, semivolatiles, and pesticide/PCBs using the CLP low concentration SOW OLC01.0, or the most recent SOW version.

Warzyn, Inc., of Madison, Wisconsin, will analyze the residential well samples for TAL metals and cyanide using the methods for low concentration analyses described in the SOP provided in Appendix A.

## **2.4 Quality Assurance Organization**

Section 2.4 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition:

Internal Laboratory Audits: RMAL, Hauser, CompuChem, Warzyn, Skinner & Sherman, and ARDL QA Officers.

## **2.5 Performance and System Audits**

Section 2.5 of the approved QAPP, dated November 12, 1990, is applicable as presented.

### **3.0 QUALITY ASSURANCE OBJECTIVES**

Section 3.0 provided in the approved QAPP, dated November 12, 1990, is applicable as presented.

#### **3.1 Level of Quality Control Effort**

Section 3.1 of the approved QAPP, dated November 12, 1990, is applicable as presented.

#### **3.2 Accuracy, Precision, and Sensitivity of Analyses**

Section 3.2 of the approved QAPP, dated November 12, 1990, is applicable as presented except for the additional information that is included in the following subsections.

##### **3.2.1 Field Instruments**

Section 3.2.1 of the approved QAPP, dated November 12, 1990, is applicable as presented.

##### **3.2.2 Laboratory Instruments**

Section 3.2.2 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition:

The Phase II activities will use the CLP SOW OLM01.0 for organics analysis and the CLP SOW ILM01.0 for inorganics analysis or the most current SOWs in effect at the time sampling begins. The accuracy and precision requirements for

the TCL and TAL parameters are specified in the CLP SOWs. The accuracy and precision requirements for the low concentration TCL parameters are specified in the CLP SOW OLC01.0. The accuracy and precision requirements for the low concentration TAL parameters are specified in Warzyn's SOP for low-concentration analyses (Appendix A). A summary of the project-specific accuracy and precision requirements for all Phase II laboratory analyses is presented in Table 3-1.

### **3.3 Data Completeness, Representativeness, and Comparability**

Section 3.3 of the approved QAPP, dated November 12, 1990, is applicable as presented.

### **3.4 Documentation**

Section 3.4 of the approved QAPP, dated November 12, 1990, is applicable as presented.

### **3.5 Quality Control Requirements**

Section 3.5 of the approved QAPP, dated November 12, 1990, is applicable as presented.

## **4.0 SAMPLING PROCEDURES**

The sampling and analysis procedures presented in the approved Sampling and Analysis Plan, dated November 12, 1990, are applicable as presented except for the additions and clarifications presented in the following subsections.

### **4.1 Sample Locations and Frequency**

The discussion of sample locations and frequency presented in the approved Sampling and Analysis Plan, dated November 12, 1990, is applicable as presented with the following changes:

Tables 3-1 and 3-2 in the approved Sampling and Analysis Plan are superseded by Table 1-3 in the QAPP Addendum.

#### **4.1.1 Monitoring Well Sampling**

The Phase II monitoring well sample locations and the rationale for selecting these locations are presented in Sections 2.3 and 4.3 of the Phase II Work Plan-Part A.

#### **4.1.2 On-Site Soil Sampling**

The Phase II on-site soil sampling locations and the rationale for selecting these locations is presented in Section 3.2 of the Phase II Work Plan-Part B.



#### **4.1.3 Background Soil Sampling**

The Phase II background soil sampling locations and the rationale for selecting these locations is presented in the Phase II Work Plan-Part B, dated October 7, 1991.

#### **4.1.4 Surface Water Sampling**

The surface water sample locations and the rationale for selecting these locations presented in the approved Sampling and Analysis Plan, dated November 12, 1990, are applicable as presented.

#### **4.1.5 NAPL Sampling**

The NAPL sample location and the rationale for selecting this location is presented in Sections 2.3 and 4.2 of the Phase II Work Plan-Part A.

#### **4.1.6 Residential Well Sampling**

The residential well sample location and the rationale for selecting this location is presented in Sections 2.4 and 4.4 of the Phase II Work Plan-Part A.

## **4.2 Sample Designation**

The sample designation procedures presented in the approved Sampling and Analysis Plan, dated November 12, 1990, are applicable as presented except for the modifications presented in Section 3.3.1 of the Phase II Work Plan-Part B.

## **4.3 Sampling Equipment and Procedures**

The discussion of sampling equipment and procedures presented in the approved Sampling and Analysis Plan is applicable as presented with the additions to the following subsections.

### **4.3.1 Monitoring Network Design and Well Installation**

The monitoring network design and well installation procedures presented in the approved Sampling and Analysis Plan, dated November 12, 1990, are applicable as presented except for the changes outlined in Section 4.1 of the Phase II Work Plan-Part A.

### **4.3.2 Ground Water Sampling**

The ground water sampling procedures presented in the approved Sampling and Analysis Plan, dated November 12, 1990, are applicable as presented except for the changes presented in Section 4.3 of the Phase II Work Plan-Part A.

#### **4.3.3 On-Site Soil Sampling**

The on-site soil sampling procedures presented in the approved Sampling and Analysis Plan, dated November 12, 1990, are applicable as presented except as modified by Section 3.2.2 and 3.2.3 of the Phase II Work Plan-Part B.

#### **4.3.4 Background Soil Sampling**

The background soil sampling procedures are presented in Section 3.2.3 of the Phase II Work Plan-Part B.

#### **4.3.5 Surface Water Sampling**

The surface water sampling procedures presented in the approved Sampling and Analysis Plan, dated November 12, 1990, are applicable as presented.

#### **4.3.6 NAPL Sampling**

The NAPL sampling procedures are presented in Section 4.2 of the Phase II Work Plan-Part A.

#### **4.3.7 Residential Well Sampling**

The residential well sampling procedures are presented in Section 4.4 of the Phase II Work Plan-Part A.

#### **4.4 Sampling Handling and Analysis**

The sampling handling and analysis procedures presented in the approved Sampling and Analysis Plan, dated November 12, 1990, are applicable as presented.

##### **4.4.1 Sample Preparation, Handling, and Shipment**

The sample preparation, handling, and shipment procedures presented in the approved Sampling and Analysis Plan, dated November 12, 1990, are applicable as presented except as modified in Sections 4.1 to 4.5 of the Phase II Work Plan-Part A and Sections 3.3.3 to 3.3.5 of the Phase II Work Plan-Part B. Table 4-1 summarizes the sample preservation, handling, and bottle requirements.

## **5.0 SAMPLE CUSTODY**

The sample custody procedures provided in the approved QAPP, dated November 12, 1990, are applicable as presented except as noted in the following subsections.

### **5.1 Field Custody Procedures**

Section 5.1 and its subsections provided in the approved QAPP, dated November 12, 1990, are applicable as presented.

### **5.2 Laboratory Custody Procedures**

Section 5.2 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition:

The chain-of-custody procedures to be followed by Skinner & Sherman, RMAL, CompuChem, Warzyn, and Hauser are presented in Appendices B, C, D, E, and F, respectively.

### **5.3 Final Evidence File**

Section 5.3 of the approved QAPP, dated November 12, 1990, is applicable as presented.

## **6.0 CALIBRATION PROCEDURES**

The calibration procedures provided in the approved QAPP, dated November 12, 1990, are applicable as presented with the exception of the following additions to specific subsections.

### **6.1 Field Instruments**

Section 6.1 of the approved QAPP, dated November 12, 1990, is applicable as presented.

### **6.2 Laboratory Equipment**

Section 6.2 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition:

RMAL, CompuChem, Warzyn, and Skinner & Sherman will be responsible for the calibration and maintenance of the analytical equipment used for their laboratory analyses. RMAL and Skinner & Sherman will follow exactly the calibration and maintenance procedures outlined in the CLP SOW OLM01.0 for organics and the CLP SOW ILM01.0 for inorganics or the most current versions of these SOWs at the date sampling begins. For analysis of the TCLP extract, RMAL will follow the calibration and maintenance procedures specified in the CLP SOW OLM01.0 for organics and CLP SOW ILM01.0 for inorganics, or the most current SOW versions. For analysis for the TCL organics in the residential well samples, CompuChem will follow exactly the calibration and maintenance procedures outlined in the CLP SOW OLC01.0 for organics or the most current version of this SOW at the date sampling begins. For analysis of the TAL

inorganics in the residential well samples, Warzyn will follow the calibration and maintenance procedures described in their SOP for low-concentration inorganic analyses (Appendix A). For analysis of the viscosity of the NAPL, Hauser will follow exactly the calibration and maintenance procedures described in their viscosity SOP (Appendix A). For analysis of the specific gravity of the NAPL, RMAL will follow exactly the calibration and maintenance procedures described in their specific gravity SOP (Appendix A).

## **7.0 ANALYTICAL PROCEDURES**

The analytical procedures provided in the approved QAPP, dated November 12, 1990, are applicable as presented except for the following additions:

The CLP TCL and TAL analyses will be conducted by RMAL, ARDL, and Skinner & Sherman using methods specified in the RAS SOW OLM01.0 for organics and the RAS SOW ILM01.0 for inorganics, or the most current versions that are used by CLP laboratories at the time sampling begins.

RMAL will perform the TCLP extraction of the NAPL sample by following their TCLP extraction SOP included in Appendix A. The TCLP extract will be analyzed using the exact methods specified in the RAS SOW OLM01.0 for organics and the RAS SOW ILM01.0 for inorganics, or the most current versions of these SOWs at the time sampling begins. Hauser will perform viscosity analysis of the NAPL sample in accordance with their viscosity SOP (Appendix A). RMAL will perform the specific gravity analysis of the NAPL sample in accordance with their specific gravity SOP (Appendix A).

CompuChem will analyze the residential well samples for TCL organics using the methods for low-concentration organic analyses specified in the CLP SOW OLC01.0 for organics or the most current SOW version. Warzyn will analyze the residential well samples for low-concentration TAL metals and cyanide in accordance with their SOP for low-concentration inorganic analyses (Appendix A).



## **8.0 DATA REDUCTION, VALIDATION, AND REPORTING**

The data reduction, validation, and reporting discussion provided in the approved QAPP, dated November 12, 1990, is applicable as presented except for the following:

Skinner & Sherman, RMAL, CompuChem, Warzyn, and Hauser will be responsible for reducing and reporting their own analytical data. Environmental Standards, Inc. will validate the Round Two ground water, NAPL, and residential well data.

### **8.1 Documentation**

Section 8.1 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition:

The laboratory documentation procedures utilized by Skinner & Sherman, RMAL, CompuChem, Warzyn, and Hauser are provided in Appendices B, C, D, E, and F, respectively. The non-CLP documental procedures utilized by these laboratories are provided in Appendix A.

## 8.2 Data Reduction

Section 8.2 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition:

Analytical data reduction will be carried out in-house by Skinner & Sherman, RMAL, ARDL, CompuChem, Warzyn, and Hauser on their respective data sets. Reduction of all TCL-organic and TAL-inorganic data will be completed by RMAL, ARDL, and Skinner & Sherman in exact accordance with the CLP SOW OLM01.0 for organics and the CLP SOW ILM01.0 for inorganics, or the most recent SOW versions. Because the TCLP extract will be analyzed in strict accordance with the CLP SOW OLM01.0 for organics and SOW ILM01.0 for inorganics, the TCLP data will be reduced by RMAL using the applicable procedures outlined in these CLP SOWs. Reduction of the TCL organic, TAL inorganic, and TCLP data ensures that the actual quantities reported are accurate and appropriately qualified. The reported quantities will be as directed, qualified or not, by the laboratory. Compounds detected in blanks will not be subtracted from the analytical results of investigative samples and will be reported separately.

Reduction of the TCL low-concentration organic data will be performed by CompuChem in accordance with the CLP SOW OLC01.0 for organics, or the most recent SOW version. Warzyn will reduce the TAL low-concentration inorganic data in accordance with their SOP for low-concentration inorganic analyses (Appendix A). The data reduction procedures used by Hauser for the viscosity analyses are presented in their SOP for this analysis (Appendix A). The

data reduction procedures used by RMAL for the specific gravity analyses are presented in their SOW for this analysis (Appendix A).

### **8.3 Data Validation**

The data validation description provided in the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition:

RMAL, ARDL, CompuChem, Warzyn, and Skinner & Sherman will perform laboratory analyses as part of the Phase II RI. The TCLP analytical data as well as the low-concentration TCL organic and TAL inorganic data will be validated by Environmental Standards, Inc. using the USEPA documents "Laboratory Data Functional Guidelines for Evaluation of Organic Analyses" (2/88) and "Laboratory Data Functional Guidelines for Evaluation of Inorganics Analyses" (7/88) or the most current versions at the time sampling begins. The viscosity and specific gravity results will not be validated.

### **8.4 Reporting**

The reporting requirements provided in the approved QAPP, dated November 12, 1990, are applicable as presented except as follows:

The reporting requirements (i.e., data deliverables) described in the CLP SOW OLM01.0 for organics and CLP SOW ILM01.0 for inorganics, or the most current SOWs available at the time sampling begins, will be followed for reporting the TCL and TAL data for the monitoring well, NAPL, surface water,

on-site soil, and background soil samples. The reporting requirements described in the CLP SOW OLC01.0 for organics and CLP SOW ILC01.0 for inorganics, or the most current SOWs available at the time sampling begins, will be followed for reporting the TCL and TAL data for the residential well samples.

## **9.0 INTERNAL QUALITY CONTROL CHECKS**

The internal quality control checks provided in the approved QAPP, dated November 12, 1990, are applicable as presented with the following additions to the applicable subsections.

### **9.1 Field Quality Control**

Section 9.1 of the approved QAPP, dated November 12, 1990, is applicable as presented.

### **9.2 Laboratory Quality Control**

Section 9.2 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition:

RMAL, ARDL, and Skinner & Sherman will perform the internal quality control checks, laboratory performance, and system audits specified in the CLP RAS SOWs (OLM01.0 and OLM01.1) for organics and CLP RAS SOW ILM01.0 for inorganics. These Quality Control (QC) checks will apply to all TCL organic and TAL inorganic analyses including the TCLP extract.

CompuChem shall conform to the CLP SOW OLC01.0 in performing the internal quality control checks, laboratory performance, and system audits for the low concentration organic analysis. Warzyn will perform the internal quality control checks, laboratory performance, and system audits specified in their SOP for low concentration inorganic analyses (Appendix A).

Hauser will perform the internal quality control checks, laboratory performance audits, and system audits specified in their viscosity and general laboratory SOP (Appendices A and F). RMAL will perform the internal quality control checks, laboratory performance audits, and system audits specified in their specific gravity and general laboratory SOPs (Appendices A and C).

For non-CLP analyses, the internal QC checks are summarized below and discussed in further detail in their respective SOPs (Appendix A).

<u>Analysis</u>	<u>QC Check Method</u>
TCLP Extract Organics	Procedural and Solvent Blanks Surrogate Spikes Matrix Spike Duplicates Compound Identification Criteria
TCLP Extract Inorganics	Preparation Blanks Sample Spikes Sample Duplicates Laboratory Control Samples Detection Limits Report
TAL Inorganics (with low detection limits)	Same as TAL Inorganics

## **10.0 PERFORMANCE AND SYSTEM AUDITS**

The description of performance and system audits provided in the approved QAPP, dated November 12, 1990, is applicable as presented with the following additions to the appropriate subsections.

### **10.1 Internal Audits**

The description of internal audits provided in the approved QAPP, dated November 12, 1990, is applicable as presented with a minor addition to Section 10.1.2.

#### **10.1.1 Field Activities**

Section 10.1.1 of the approved QAPP, dated November 12, 1990, is applicable as presented.

#### **10.1.2 Laboratory Activities**

Subsection 10.1.2 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition:

The performance and system audits performed by Skinner & Sherman, RMAL, CompuChem, Warzyn, and Hauser are summarized on Table 10-1 and documented in more detail in Appendices B,C,D,E, and F, respectively.

## **10.2 External Audits**

Section 10.2 of the approved QAPP, dated November 12, 1990, is applicable as presented.



## **11.0 PREVENTATIVE MAINTENANCE**

The description of preventative maintenance provided in the approved QAPP, dated November 12, 1990, is applicable as presented with minor additions to Section 11.2.

### **11.1 Field Equipment**

Section 11.1 of the approved QAPP, dated November 12, 1990, is applicable as presented.

### **11.2 Laboratory Equipment**

Section 11.2 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition:

The preventative maintenance procedures for their laboratory equipment will be the responsibility of Skinner & Sherman, RMAL, CompuChem, Warzyn, and Hauser. Skinner & Sherman's, RMAL's, CompuChem's, Warzyn's, and Hauser's preventative maintenance programs are documented in Appendices B, C, D, E, and F, respectively.

## **12.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS**

The specific routine procedures used to assess data precision, accuracy, and completeness provided in the approved QAPP, dated November 12, 1990, are applicable as presented.

## **13.0 CORRECTIVE ACTION**

The description of corrective action provided in the approved QAPP, dated November 12, 1990, is applicable as presented with an addition to Subsection 13.2.

### **13.1 Immediate Corrective Action in the Field**

Section 13.1 of the approved QAPP, dated November 12, 1990, is applicable as presented.

### **13.2 Immediate Corrective Action in the Laboratory**

Section 13.2 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition.

Skinner & Sherman's, RMAL's ,CompuChem's, Warzyn's, and Hauser's procedures for immediate corrective action in the laboratory are presented in Appendices B, C,D,E, and F, respectively.

### **13.3 Other Corrective Action**

Section 13.3 of the approved QAPP, dated November 12, 1990, is applicable as presented.

#### **14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT**

Section 14.0 of the approved QAPP, dated November 12, 1990, is applicable as presented with the following addition.

Skinner & Sherman's, Warzyn's, Hauser's and CompuChem's Quality Assurance Officer (QAOs) will provide monthly quality assurance reports to the ERM-North Central's Project Manager. RMAL's Program Administrator will provide monthly QA reports to ERM. These reports will be reviewed by RMAL's QAO.



**TABLE 1-1**

**TCLP TARGET PARAMETERS AND  
PROJECT-REQUIRED DETECTION LIMITS  
FOR NAPL ANALYSIS  
LENZ OIL SERVICE, SERVICE INC. SITE  
(Page 1 of 2)**

<b>Parameter</b>	<b>Project-Required Limits mg/L**</b>
Arsenic	5.0
Barium	100.0
Benzene	0.5
Cadmium	1.0
Carbon tetrachloride	0.5
Chlordane	0.03
Chlorobezene	100.0
Chloroform	6.0
Chromium	5.0
2-methyl phenol	200.0
3-methyl phenol*	200.0
4-methyl phenol*	200.0
2,4-D	10.0
1,4-Dichlorobenzene	7.5
1,2-Dichloroethane	0.5
1,1-Dichloroethene	0.7
2,4-Dinitrotoluene	0.13
Endrin	0.02
Heptachlor (and its epoxide)	0.008
Hexachlorobenzene	0.13
Hexachlorobutadiene	0.5
Hexachloroethane	3.0

**TABLE 1-1**

**TCLP TARGET PARAMETERS AND  
PROJECT-REQUIRED DETECTION LIMITS  
FOR NAPL ANALYSIS  
LENZ OIL SERVICE, SERVICE INC. SITE  
(Page 2 of 2)**

<b>Parameter</b>	<b>Project-Required Limits mg/L**</b>
Lead	5.0
Lindane	0.4
Mercury	0.2
Methoxychlor	10.0
2-Butanone (MEK)	200.0
Nitrobenzene	2.0
Pentachlorophenol	100.0
Pyridine	5.0
Selenium	1.0
Silver	5.0
Tetrachloroethene	0.7
Toxaphene	0.5
Trichloroethene	0.5
2,4,5-Trichlorophenol	400.0
2,4,6-Trichlorophenol	2.0
2,4,5-TP (Silvex)	1.0
Vinyl chloride	0.2

\* 3-methyl phenol and 4-methyl phenol cannot be differentiated and will be reported as 3/4-methyl phenol.

\*\* RMAL reporting limits will be lower unless matrix or high levels of target compounds require dilution of sample.

**TABLE 1-2**  
**TCL AND TAL TARGET PARAMETERS AND**  
**PROJECT-REQUIRED DETECTION LIMITS**  
**FOR RESIDENTIAL WELL SAMPLES**  
(Page 1 of 9)

Volatiles	CAS Number	Quantitation Limits Water ug/L
1. Chloromethane	74-87-3	1
2. Bromomethane	74-83-9	1
3. Vinyl Chloride	75-01-4	1
4. Chloroethane	75-00-3	1
5. Methylene Chloride	75-09-2	2
6. Acetone	67-64-1	5
7. Carbon Disulfide	75-15-0	1
8. 1,1-Dichloroethene	75-35-4	1
9. 1,1-Dichloroethane	75-34-3	1
10. cis-1,2-Dichloroethene	156-59-4	1
11. trans-1,2-Dichloroethene	156-60-5	1
12. Chloroform	67-66-3	1
13. 1,2-Dichloroethane	107-06-2	1
14. 2-Butanone	78-93-3	5
15. Bromochloromethane	74-97-5	1
16. 1,1,1-Trichloroethane	71-55-6	1
17. Carbon Tetrachloride	56-23-5	1
18. Bromodichloromethane	75-27-4	1
19. 1,2-Dichloropropane	78-87-5	1
20. cis-1,3-Dichloropropene	10061-01-5	1
21. Trichloroethene	79-01-6	1
22. Dibromochloromethane	124-48-1	1
23. 1,1,2-Trichloroethane	79-00-2	1



**TABLE 1-2**  
**TCL AND TAL TARGET PARAMETERS AND**  
**PROJECT-REQUIRED DETECTION LIMITS**  
**FOR RESIDENTIAL WELL SAMPLES**  
(Page 2 of 9)

24. Benzene	71-43-2	1
25. trans-1,3-Dichloropropene	10061-02-6	1
26. Bromoform	75-25-2	1
27. 4-Methyl-2-pentanone	108-10-1	5
28. 2-Hexanone	591-78-6	5
29. Tetrachloroethene	127-18-4	1
30. 1,1,2,2-Tetrachloroethane	79-34-5	1
31. 1,2-Dibromoethane	106-93-4	1
32. Toluene	108-88-03	1
33. Chlorobenzene	108-90-7	1
34. Ethylbenzene	100-41-4	1
35. Styrene	100-42-5	1
36. Xylenes (total)	1330-20-7	1
37. 1,3-Dichlorobenzene	541-73-1	1
38. 1,4-Dichlorobenzene	106-46-7	1
39. 1,2-Dichlorobenzene	95-50-1	1
40. 1,2-Dibromo-3-chloropropane	96-12-8	1

**TABLE 1-2**  
**TCL AND TAL TARGET PARAMETERS AND**  
**PROJECT-REQUIRED DETECTION LIMITS**  
**FOR RESIDENTIAL WELL SAMPLES**  
**(Page 3 of 9)**

Semivolatiles	CAS Number	Quantitation Limits Water ug/L
1. Phenol	108-95-2	5
2. bix-(2-Chloroethyl)ether	111-44-4	5
3. 2-Chlorophenol	95-57-8	5
4. 2-Methylphenol	95-48-7	5
5. 2,2'-oxybis(1-Chloropropane)	108-60-1	5
6. 4-Methylphenol	106-44-5	5
7. N-Nitroso-di-n-propylamine	621-64-7	5
8. Hexachloroethane	67-72-1	5
9. Nitrobenzene	98-95-3	5
10. Isophorone	79-59-1	5
11. 2-Nitrophenol	88-75-5	5
12. 2,4-Dimethylphenol	105-67-9	5
13. bix-(2-Chloroethoxy)methane	11-91-1	5
14. 2,4-Dichlorophenol	120-83-2	5
15. 1,2,4-Trichlorobenzene	120-82-1	5
16. Naphthalene	91-20-3	5
17. 4-Chloroaniline	106-47-8	5
18. Hexachlorobutadiene	87-68-3	5
19. 4-Chloro-3-methylphenol	59-50-7	5
20. 2-Methylnaphthalene	91-57-6	5
21. Hexachlorocyclopentadiene	77-47-4	5
22. 2,4,6-Trichlorophenol	88-06-2	5
23. 2,4,5-Trichlorophenol	95-95-4	20

**TABLE 1-2**  
**TCL AND TAL TARGET PARAMETERS AND**  
**PROJECT-REQUIRED DETECTION LIMITS**  
**FOR RESIDENTIAL WELL SAMPLES**  
(Page 4 of 9)

24. 2-Chloronaphthalene	91-58-7	5
25. 2-Nitroaniline	88-74-4	20
26. Dimethylphthalate	131-11-3	5
27. Acenaphthylene	208-96-8	5
28. 2,6-Dinitrotoluene	606-20-2	5
29. 3-Nitroaniline	99-09-2	20
30. Acenaphthene	83-32-9	5
31. 2,4-Dinitrophenol	51-28-5	20
32. 4-Nitrophenol	100-02-7	20
33. Dibenzofuran	132-64-9	5
34. 2,4-Dinitrotoluene	121-14-2	5
35. Diethylphthalate	84-66-2	5
36. 4-Chlorophenyl-phenylether	7005-72-3	5
37. Fluorene	86-73-7	5
38. 4-Nitroaniline	100-01-6	20
39. 4,6-Dinitro-2-methylphenol	534-52-1	20
40. N-Nitrosodiphenylamine	86-30-6	5
41. 4-Bromophenyl-phenylether	101-55-3	5
42. Hezachlorobenzene	118-74-1	5
43. Pentachlorophenol	87-86-5	20
44. Phenanthrene	85-01-8	5
45. Anthracene	120-12-7	5
46. Di-n-butylphthalate	84-74-2	5
47. Fluoranthene	206-44-0	5
48. Pyrene	129-00-0	5

**TABLE 1-2**  
**TCL AND TAL TARGET PARAMETERS AND**  
**PROJECT-REQUIRED DETECTION LIMITS**  
**FOR RESIDENTIAL WELL SAMPLES**  
**(Page 5 of 9)**

49. Butylbenzylphthalate	85-68-7	5
50. 3,3'-Dichlorobenzidine	91-94-1	5
51. Benzo(a)anthracene	56-55-3	5
52. Chrysene	218-01-9	5
53. bis-(2-Ethylhexyl)phthalate	117-81-7	5
54. Di-n-octylphthalate	117-84-0	5
55. Benzo(b)fluoranthene	205-99-2	5
56. Benzo(k)fluoranthene	207-08-9	5
57. Benzo(a)pyrene	50-32-8	5
58. Indeno(1,2,3-cd)pyrene	193-39-5	5
59. Dibenz(a,h)anthracene	53-70-3	5
60. Benzo(g,h,i)perylene	191-24-2	5

**TABLE 1-2**  
**TCL AND TAL TARGET PARAMETERS AND**  
**PROJECT-REQUIRED DETECTION LIMITS**  
**FOR RESIDENTIAL WELL SAMPLES**  
**(Page 6 of 9)**

Pesticides/PCBs	CAS Number	Quantitation Limits Water ug/L
1. alpha-BHC	319-84-6	0.01
2. beta-BHC	319-85-7	0.01
3. delta-BHC	319-36-8	0.01
4. gamma-BHC (Lindane)	58-89-9	0.01
5. Heptachlor	76-44-8	0.01
6. Aldrin	309-00-2	0.01
7. Heptachlor epoxide	1024-57-3	0.01
8. Endosulfan I	959-98-8	0.01
9. Dieldrin	60-57-1	0.02
10. 4,4' - DDE	72-55-9	0.02
11. Endrin	72-20-8	0.02
12. Endosulfan II	33213-65-9	0.02
13. 4,4' - DDD	72-54-8	0.02
14. Endosulfan sulfate	1031-07-8	0.02
15. 4,4' - DDT	50-29-3	0.02
16. Methoxychlor	72-43-5	0.10
17. Endrin ketone	53494-70-5	0.02
18. Endrin aldehyde	7421-36-3	0.02
19. alpha-Chlordane	5103-71-9	0.01
20. gamma-Chlordan	5103-74-2	0.01
21. Toxaphene	8001-35-2	1.0
22. Aroclor-1016	12674-11-2	0.20
23. Aroclor-1221	11104-11-2	0.20

**TABLE 1-2**  
**TCL AND TAL TARGET PARAMETERS AND**  
**PROJECT-REQUIRED DETECTION LIMITS**  
**FOR RESIDENTIAL WELL SAMPLES**  
**(Page 7 of 9)**

24. Aroclor-1232	11141-16-5	0.40
25. Aroclor-1242	53469-21-9	0.20
26. Aroclor-1248	12672-29-6	0.20
27. Aroclor-1254	11097-69-1	0.20
28. Aroclor-1260	11096-82-5	0.20

**TABLE 1-2**  
**TCL AND TAL TARGET PARAMETERS AND**  
**PROJECT-REQUIRED DETECTION LIMITS**  
**FOR RESIDENTIAL WELL SAMPLES**  
**(Page 8 of 9)**

Compound	Required Instrument Detection Limit <sup>1</sup> ug/L			Required Matrix Spike Concentrations ug/L		
	GFAA	ICP	Other	GFAA	ICP	Other
Aluminum		100			2000	
Antimony <sup>2</sup>	5			20	500	
Arsenic	5			20		
Barium		50			2000	
Beryllium		5			50	
Cadmium <sup>2</sup>	0.5			2	50	
Calcium <sup>3</sup>		1000			50,000	
Chromium		10			200	
Cobalt		10			500	
Copper		10			250	
Iron		100			1000	
Lead <sup>2</sup>	2			20	500	
Magnesium <sup>3</sup>		1000			25,000	
Manganese		10			200	
Mercury			0.2			1.0
Nickel		20			400	
Potassium <sup>3</sup>			2000		20,000	
Selenium	2			10		
Silver	5				50	
Sodium <sup>3</sup>			1000		50,000	
Thallium	2			20		
Vanadium	10				500	
Zinc		20			200	
Cyanide			10			100

**TABLE 1-2**  
**TCL AND TAL TARGET PARAMETERS AND**  
**PROJECT-REQUIRED DETECTION LIMITS**  
**FOR RESIDENTIAL WELL SAMPLES**  
**(Page 9 of 9)**

<sup>1</sup> Instrument Detection Limits (IDL) must be met before any samples are analyzed. The Lab may submit their quarterly Form XI with each case if all IDLs meet the detection limits. If limits cannot be met by using ICP, use of GFAA required.

<sup>2</sup> ICP analysis results may only be reported for Sb, Cd and Pb, if the concentration is  $\geq$  10 times the IDL of instrument used. If ICP results are reported, all ICP audits are required including matrix spike.

<sup>3</sup> Report Ca, Mg, Na, and K on separate Form V for Matrix Spike if a separate aliquot is used for this spike.



**Summary of Phase II Sampling and Analysis Program**  
**Lenz Oil Service, Inc. RI/FS**  
**(Page 1 of 2)**

[illegible]

Table 1-3

Summary of Phase II Sampling and Analysis Program  
 Lenz Oil Service, Inc. RI/FS  
 (Page 2 of 2)

Sample Matrix	Field Parameters	Laboratory	Method	Laboratory Parameter	Investigative Samples			QA Samples									Matrix Total
					No.	Freq.	Total	Duplicate			Rinsate (Field Blank)			MS/MSD			
								No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	
On-Site Soil Samples	-Qualitative Description of Soil	ARDL	see Note (1)	TCL Volatile Organics	41	1	41	5	1	5	5	1	5	3	1	3	51
		ARDL	see Note (1)	TCL Semivolatile Organics	41	1	41	5	1	5	5	1	5	3	1	3	51
	-Qualitative Organic Vapor Screening with HNu	ARDL	see Note (1)	TCL Pest/PCBs	41	1	41	5	1	5	5	1	5	3	1	3	51
		Skinner	see Note (2)	TAL Total Metals	33	1	33	4	1	4	4	1	4	0	0	0	41
		Skinner	see Note (2)	TAL Cyanide	33	1	33	4	1	4	4	1	4	0	0	0	41
Background Soil Samples	-Qualitative Description of Soil	ARDL	see Note (1)	TCL Volatile Organics	3	1	3	0	0	0	0	0	0	0	0	0	3
		ARDL	see Note (1)	TCL Semivolatile Organics	3	1	3	0	0	0	0	0	0	0	0	0	3
	-Qualitative Organic Vapor Screening with HNu	ARDL	see Note (1)	TCL Pest/PCBs	3	1	3	0	0	0	0	0	0	0	0	0	3
		Skinner	see Note (2)	TAL Total Metals	3	1	3	0	0	0	0	0	0	0	0	0	3
		Skinner	see Note (2)	TAL Cyanide	3	1	3	0	0	0	0	0	0	0	0	0	3

KEY: ARDL = Applied Research Development Laboratory  
 RMAL = Rocky Mountain Analytical Laboratory  
 CompuChem = CompuChem Laboratories, Inc.  
 Skinner = Skinner & Sherman Laboratory, Inc.  
 Warzyn = Warzyn, Inc.  
 Hauser = Hauser Laboratory, Inc.  
 TCL = Target Compound List  
 TAL = Target Analyte List  
 TCLP = Toxicity Characteristics Leaching Procedures  
 Pest/PCBs = Pesticides/PCB  
 ASTM = American Society for Testing and Materials  
 MS/MSD = Matrix Spike/Matrix Spike Duplicate  
 NAPL = Nonaqueous Phased Liquids

NOTES: (1) Method CLP RAS SOW OLM01.0  
 (2) Method CLP RAS SOW ILM01.0  
 (3) SW846-1311 for sample preparation only. Analysis using method in Note (1&2).  
 (4) Low concentration samples using CLP SOW OLC01.0 for organics and Warzyn's SOPs (Appx. A) for inorganics.  
 -Field Blank samples for soil matrix samples will be equipment rinsate samples.  
 -Water samples analyzed for TAL dissolved metals will be field filtered prior to sample preservation.  
 -Total metals samples will not be field filtered.  
 -Metals samples will be preserved with HNO<sub>3</sub>; cyanide samples with NaOH; volatile organic compound samples with HCl.  
 -One trip blank sample consisting of two 40-ml glass vials filled with organic-free deionized water will be included with each shipment of aqueous samples targeted for volatile organic analysis.  
 -Surface water samples will only be analyzed for the TAL metals rejected during the Phase I sampling round.  
 -MS/MSD samples are not included in the Matrix Total.

**TABLE 3-1**

**PROJECT-REQUIRED PRECISION AND ACCURACY  
REQUIREMENTS FOR LABORATORY ANALYSES**

<b>Parameter</b>	<b>Accuracy (percent)</b>	<b>Precision (percent)</b>
TCL Volatiles	CLP	CLP
TCL Semivolatiles	CLP	CLP
TCL PCBs/Pesticides	CLP	CLP
TAL Cyanide	CLP	CLP
TCLP Extract Analysis (Organics and Inorganics)	CLP	CLP
Low Concentration Analysis (organic,	CLP	CLP
Low Concentration Analysis (Inorganic)	Warzyn's SOPs Attachment A	Warzyn's SOPs Attachment A
Viscosity	N/A	N/A
Specific Gravity	N/A	N/A

Notes:

"CLP" means the accuracy and precision requirements will be those specified in the appropriate CLP SOW.

"N/A" means that precision and accuracy requirements are not applicable to the specified laboratory analysis.

**TABLE 4-1**  
**SAMPLE VOLUME, CONTAINERS AND PRESERVATION**  
**TECHNIQUES FOR WATER AND SOIL SAMPLES**  
Page 1 of 1

MATRIX	ANALYTICAL FRACTION	CONTAINER	PRESERVATION	FILLING PROCEDURES	MAXIMUM HOLDING TIMES
Water	TCL Volatile Organic Compounds	3 - 40 ml glass vials with Teflon-lined septums	Cool - 4 degrees Celsius HCl to pH <2	Zero headspace - no air bubbles	14 days
Water	TCL Semivolatile Organic Compounds	2 - 1 liter amber glass bottles with Teflon-lined caps	Cool - 4 degrees Celsius	Fill to neck of bottle	7 days from collection or 5 days from VTSR, 40 additional days for analysis
Water	PCBs/Pesticides	2 - 1 liter amber glass bottles with Teflon-lined caps	Cool - 4 degrees Celsius	Fill to neck of bottle	7 days from collection or 5 days from VTSR, 40 additional days for analysis
Water	TAL Dissolved Metals	1 - 1 liter polyethylene bottle	Nitric acid to pH <2 Cool - 4 degrees Celsius	Field filter and fill to neck of bottle	6 months except for Hg which is 26 days
Water	TAL Total Metals	1 - 1 liter polyethylene bottle	Nitric Acid to pH <2 Cool - 4 degrees Celsius	Fill to neck of bottle	6 months except for Hg which is 26 days
Water	Cyanide	1 - 1 liter polyethylene bottle	Sodium hydroxide to pH >12 Cool - 4 degrees Celsius	Fill to neck of bottle	14 days
Soil	TCL Volatile Organic Compounds	2 - 4 oz. wide-mouth glass bottles	Cool - 4 degrees Celsius	Fill completely, no head space	10 days
Soil	TCL Semivolatile Organic Compounds PCBs/Pesticides	1 - 1 liter wide-mouth glass bottle	Cool - 4 degrees Celsius	Fill completely	10 days
Soil	TAL Total Metals/Cyanide	1 - 8 oz. wide-mouth glass bottle	Cool - 4 degrees Celsius	3/4 Full	6 months for metals, 14 days for cyanide
Soil	TCLP Metals	2 - 1 liter amber, wide mouth glass jar with Teflon-Lined lid.	None	Fill to neck of bottle	Per SW846-131 protocol
NAPL	TCL Volatile Organic Compounds	1 - 8 oz. wide-mouth glass bottle	None	Zero headspace-no air bubbles	14 days
NAPL	TCL Semivolatile Organic Compounds PCBs/Pesticides	1 - 8 oz. wide-mouth glass bottle	None	<i>Not applicable</i>	7 days from collection or 5 days from VTSR, 40 additional days for analysis
NAPL	TAL Total Metals/Cyanide	<i>To be taken from the semivolatiles bottle</i>	None	Fill to neck of bottle	6 months except for Hg which is 26 days
NAPL	Viscosity/Specific gravity	<i>To be taken from the 32-oz. TCLP bottle</i>	None	Not applicable	Not applicable
NAPL	TCLP	1 - 32 oz. wide-mouth glass bottle 1 - 4 oz. wide-mouth glass bottle	None	<i>Zero headspace-no air bubbles</i>	Per SW846-131 protocol

KEY: VTSR = Verified Time of Sample Receipt  
NAPL = Non-Aqueous Phased Liquid

Table 10-1

**Summary of Laboratory  
Performance and System Audits  
Lenz Oil Service, Inc. Site**

Laboratory	Audit Type	Audit Frequency	Auditor
Skinner & Sherman	WS/WP PES	Quarterly	USEPA
	NYDOH	Quarterly	N.Y. State
	Internal Lab Procedure	Semiannually	Lab QAO
	Blind PE samples (inorganics only)	Quarterly	USEPA
	System Audit	Annually	Corporate QA Program Manager
RMAL	WS/WP PES	Semiannually	USEPA
	Internal Lab Procedure	Quarterly	Lab QAO
	Blind PE samples	Quarterly	USEPA
	Site Audit	Annually	Corporate QA Program Manager
	Site Audit	Not Specified	USEPA
	Site Audit	Not Specified	Army Corp of Engineers
	Blind PE samples	Not Specified	Army Corp of Engineers
	Site Audit	Not Specified	U.S. Navy - NEESA
	Blind PE samples	Not Specified	U.S. Navy - NEESA
CompuChem	WS/WP PES	Semiannually	USEPA
	Internal Lab Procedure	Quarterly	Lab QAO
	Blind PE samples	Quarterly	USEPA
	Internal Lab Procedure	Quarterly	Lab QAO
Warzyn	Double Blind PES	Quarterly	Lab QAO
	WS PES	Semiannually	USEPA
	WP PES	Semiannually	USEPA
	Single Blind PE (inorganic)	Quarterly	USEPA-CLP
	Single Blind PE samples	As required	New Jersey DEP
	Site Audit	3 years	Wisconsin DNR
	Site Audit	2 years	EPA Region V
	Site Audit	Project Basis	EPA Region V

**KEY:** CompuChem = CompuChem Laboratories, Inc.  
 RMAL = Rocky Mountain Analytical Laboratory  
 NYDOH = New York Department of Health  
 PE = Performance Evaluation  
 QA = Quality Assurance  
 QAO = Quality Assurance Officer  
 New Jersey DEP = New Jersey Department of Environmental Protection